RESEARCH PROPOSAL

WATER RESOURCES:PROBLEMS,CHALLENGES AND PROSPECTS- A STUDY OF JAIPUR REGION

For Registration to the Degree of

Doctor Of Philosophy

IN THE FACULTY OF SCIENCE

THE IIS(deemed to be UNIVERSITY),JAIPUR

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ICG/2017/24586

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(AUGUST 2018)

TENTATIVE TOPIC:

WATER RESOURCES: PROBLEMS, CHALLENGES AND PROSPECTS-A STUDY OF JAIPUR REGION

STATEMENT OF THE PROBLEM

Water resources are natural resources which have several uses like agriculture, industrial, household, recreational and environmental activities.97% of the water on the earth is salt,3% is freshwater,two-third area covered by frozen in glacier and polar ice caps.Remaining unfrozen freashwater is found mainly as groundwater.In Jaipur Region 97% water requirement is depended on groundwater.

INTRODUCTION OF JAIPUR REGION

Jaipur is the capital and largest city of the India states of Rajasthan founded in 1727 by Kachhwaha Rajput named Jai Singh II .Its boundary extends from $26^{0}46'N$ Latitude to $27^{O}01'N$ Latitude and $75^{0}39'E$ Longitude to $75^{0}5'E$ Longitude. Jaipur ranks 10^{th} in the list of Indian Megacities with an annual growth rate of 4.94% between 2001-2011. According to the census 2011, Jaipur is having total population of 66,26,178 of which 34,68,507 are males and 31,57,671 are females. Out of the total population 47.6% of population lives in urban area and 52.4% lives in rural area. Jaipur region is divided into 13Tehsils,2,180 villages 22towns.Jaipur was designed into 9blocks, two out of which contained in state Building and Palaces and remaining seven are allotted to the Public.

GEOLOGY AND SOIL

Jaipur region is covered with alluvium Aeolian deposits of quaternary age.Few isolated,linear, Ridges and hillocks trending ENE-WEW to NE-SW form prominent landmarks in the North -Western part of the area. Jaipur region is covered with several soil units and also some other features such as sanddunes, rocky outcrops,waterbodie etc. Gneisses,megmatites,meta-sedimentary rocks occur concealed under thick cover of alluvium and Aeolian sand in the area.

DRAINAGE SYSTEM

Jaipur region is drained by ephermal rivers like Banganga,Dhund,Mendha,Sota,Sabi,Mashi and their tributaries. Jaipur region is largely guided by erosion.Dhund river and Amanishah Nallah form a Folk like drainage pattern in the confluence zone in which major part of the Jaipur is situated. Amanishah Nallah orginates from the western slopes of Jaigarh hills and flows Northwards in the upper reaches turns south and south-west in its middle course and flow towards East with a broad semi-circular course.Further Downstream it joins the dhund river. Another small drainage system in the northern foothills,where the present discharge the city's waste effluents into an artificially impounded lake called Jai Mahal(Man Sagar).

This region is drained by a number of seasonal rivers i.e. river Banganga,river Dhund river,river Bandi,Amanishah Nallah these are seasonal stream flow from North to South near city.Ramgarh lake was the main source of supply more than 30years back but has now dried up.

Major Rivers of Jaipur Region are:

1)Banganga: This river originates from the Bairath hills.It passes through Fatehbad,Bharatpur, and Sawai madhopur and drains into Yamuna.River basin extends over the Alwar,Jaipur,Dausa, Sawai Madhopur and Bharatpur districts. Ramgarh Dam has been constructed on this river. Major Tributries are:Gunti Nala,Suri river,Palasan river,Sanswan river.

2)Dhund River: Dhund river is an ephemeral river,forms a North-South elongated river basin

in the semi-desert terrain of Jaipur District.

3)Mashi River: Mashi river is the tributary of Banas river. It originates near Kishangarh in Ajmer District.Catchment area of the river is 6,335km^2.It flows from east and south in partly Plains and hills in areas of Tonk and Ajmer district before joining Banas river near Tonk.

4)Morel River: Morel river is the tributary river of Banas river.It Originates near Chainpura and Dharla villages in Bassi tehsil of Jaipur District.Its catchment area are 5,491 km^2.It flows South-East and then South-West upto the confluence with the Dhund River and Southeast in Jaipur and Sawai Madhopur District before joining the Banas.Major tributaries are Dhund, Kankrauli and Kalisil are the major tributaries of the Morel River.

5)Sabi River: Sahibi river also known as Sabi river.This is ephermal river flowing through Rajasthan,Haryana,Delhi.It originates from the eastern slopes of Sawai protected forest hills in Aravali range near Manoharpur and Jitgarh in Sikar District of Rajasthan.Its major tributaries are Dohan river,Sota river,Kishanavati river.Its Catchment area comprises are Sikar,Jaipur, Alwar in North/East Rajasthan state-Bawal,Rewari,Patudi,Jhajjal district in southern Haryana State.

6)Drayawati River: This river originates from the western slope of Amber hills at the foothills of the Nahargarh fort in Jaisalya village and flows through the westernside from Jaipur City, North to South over a length of 45.5km to meet river Dhund.Gular Dam in Sanganer and Ramchandrapura Dam built at Vidhani on the Drayavati River.

CHRONOLOGICAL DEVELOPMENT OF WATER MANGEMENT IN JAIPUR REGION

According to the article“Water Scarcity in Jaipur”(Rajasthan).Ramgarh lake was rapidly depleated in the 1980s and 1990s and could no longer be used as a main source of water for Jaipur.This led to a shift to and a heavy dependence on groundwater sources.Emergency measures were sanctioned in 1989-90,which resulted in the installation of 202 hand pumps

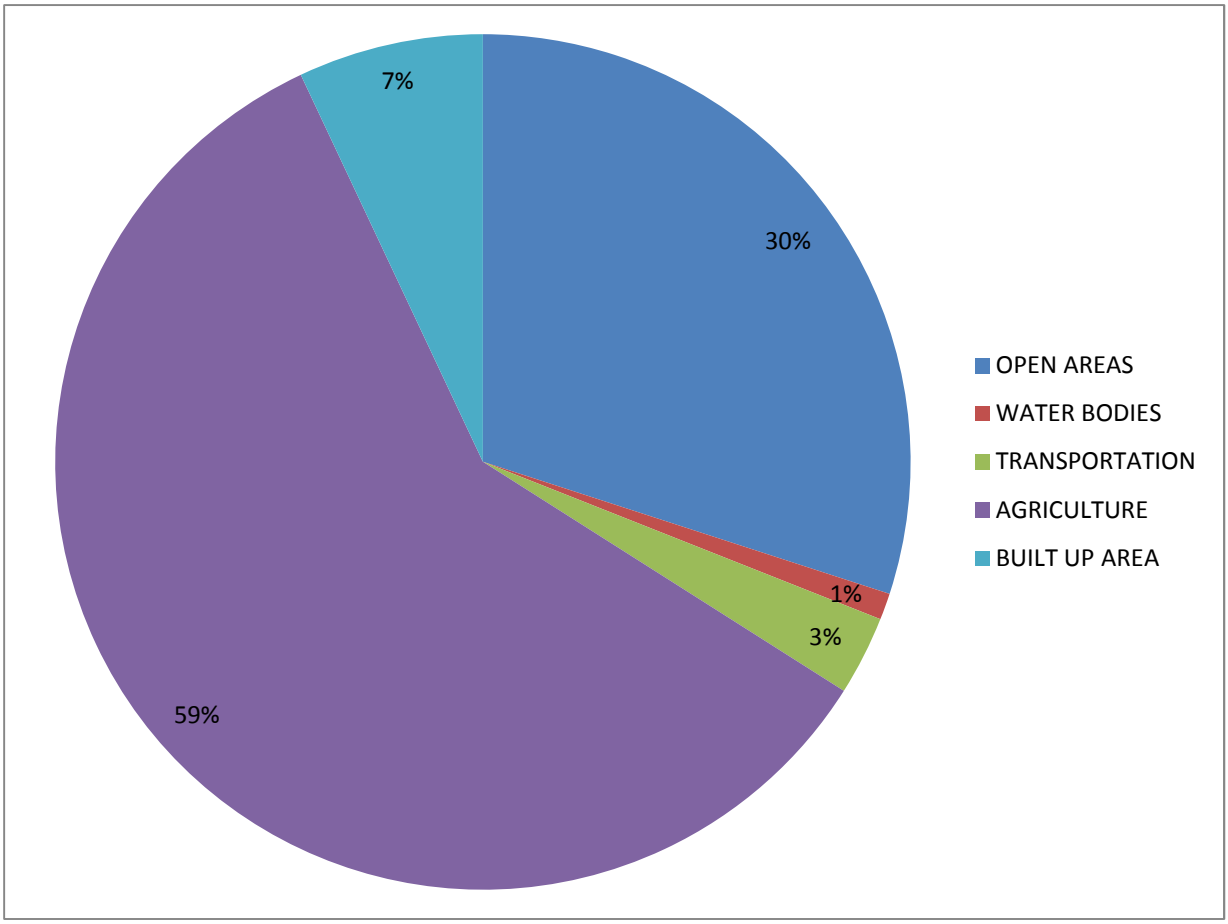
and 31 tube wells. In the Mid-1990s Bisalpur Dam was Commissioned by the Rajasthan Government found to be inefficient . Bisalpur Dam is located in the Tonk District of Rajasthan, over 150 kilometers from the centres of Jaipur,and provides water to Tonk,Ajmer,and Jaipur. The Capacity of Bisalpur Dam is 1,095 million cubic meters,the amount of water is highly dependent on yearly precipitation patterns.The raw water from Bisalpur Dam is pumped to a filter plant at Surajpura and undergoes filteration and chlorination.This treated water is than transferred to rural areas and Jaipur city up to the Balawala pumping station.

The pipeline system of Bisalpur Dam water in jaipur consists of a central feeder from Balawal to Jawahar circle,Ramniwas Bagh,Amanishah Nala,Shastri Nagar,vidhyadhar nagar,and VKI area. The water from the central feeder then extends from Jawahar circle to Mahesh nagar, Triveni nagar,and Barkat nagar and from Rambagh to Jypti nagar,civil lines and shashtri nagar.The pipeline system also consists of a western feeder from Balawala to Mansarovar, shyam nagar vidhyut nagar,khatipura and Jhotwara.The increased dependence on groundwater throughout the 1990s and 2000s has led to overexploitation of groundwater and a rapidly declining water table.It has been estimated that the excessive withdrawl of groundwater is at 600% in Jaipur city and groundwater supplies in areas such Jhotwara, Murlipura,Jagatpura, Malviya Nagar, part of Mansarovar, Bapu Nagar, C scheme, Jawahar Nagar etc. are almost dry. In Early stages of Jaipur City, expansion was restricted to the foothills and thus drainage pattern of surface water were not disturbed . Later, expansion block the streams of Jaipur City. 518 rivullets originating from the Aravalli Hills-398 1^{st} order streams,92 2^{nd} order streams, 25 3^{rd} order streams. Due to Expansion, 150 streams with 113 number of 1^{st} order, 37 of 2^{nd} order and 10 of 3^{rd} order are blocked. This greatly influences the availability clean surface water and groundwater recharge.

RAINFALL AND CLIMATE

Jaipur Region is located in semi-arid region of Rajasthan where summer are extremely hot and severe cold during winter.

LAND USE PATTERN OF JAIPUR REGION



Land capability units divides the region into three major uses i.e. Development area(50%)Agriculture area(29%), Eco Sensitive area(21%).

BRIEF INRODUCTION OF WATER AVAILABILITY IN VARIOUS REGION S OF JAIPUR.

Jaipur region is divided into 13 regions like Bassi, Amber, Dosa, Jhotwara, Phagi, Kotputli, Sanganer, Sambher, Chaksu, Govindgarh, Shahpura,Viratnagar,Jamwa Ramgarh having Ground Water, Bisalpur Dam, Open Wells, Borewells, Handpumps etc.sources of water. According to Zonal Classification given by Groundwater resource Department Jaipur, these areas are being classified as Over Exploited Region, Dark Zone Region and critical zones respectively. Under critical zone phagi come, under over exploited region Dudu,Kotputli, Viratnagar,Jamwa Ramgarh,Chaksu, comes and in over exploited notified region Bassi, Shahpura,Govindgarh,Sanganer,Sambhar,Amber,Jhotwara comes.

Total depth of groundwater level in these areas are classified as:Amber block(926.6m),Bairath/ Viratnagar(798.64m), Bassi Block(1852.56m),Chaksu Block(1652.75m),Dudu Block(2290.9m), Govindgarh(1621.15m), Jalsu Block(301.63m), JamwaRamgarh(1234.6m), Jhotwara block (1688.97m),Kotputli Block(1548.45m) ,Paota Block(443.9m), Phagi Block (1840.05m), Sambhar Block(1087.75m), Sanganer Block(2555.58m), Shahpura Block(1784m).

BASSI:

Bassi is the sub-division of Jaipur region in the state of Rajasthan,30km from the Jaipur coveringan area about 680km^2 including 40.21km^2 in urban area and 639.64km^2 in rural area which is now considered as a part of the main city bounded by Jamwaramgarh tehsils from north and by Sanganer,Jaipur,Amber towards west.Nearby cities of Bassi are Jaipur,Lalsot,Niwai and Bandikui.Population of the Bassi covers 2,83,594 and having 44,659 household.Total number of villages are 206.Major water sources of the Bassi are Open wells,Handpumps,and Borewells and large part of the population are dependent on groundwater which is now highly fluoride and nitrate concentration.

AMBER:

Amber is a town covering an area of 810.87Km^2 located 11km (6.8mi) from Jaipur.Population of Amber comprises 4,52,005.Number of villages are 195.Major Water Sources of Amber are: Amer Sagar,Talkatora,Maota lake.1)Amer Sagar-Amer Sagar is covered by huge Aravali ranges,was built at the time of establishing Amer.This Rectangular lake was built by great King and it was filled up with Rainwater and the whole population of Amber uses this water for domestic and other use,this is the reason why Amer sagar known as hidden lake.Main purpose of this sagar was to clear problem of water scarcity.2)Talkatora**:**Talkatora also known as "Alligator Tank" located at the link road of KanwarNagar-Brahmpuri.This lake adjoining the back portion of the Govind Devji Temple,was built at the time of establishment of Jaipur.Main Purpose of this rectangular garden at the midest of Talkatora was a symbol greenery and attraction.But now Talkatora store dirty water and sewage of nearby localities.

DUDU:

Dudu is a tehsil and Panchayat samiti in Jaipur District in the state of Rajasthan located 74km from the Jaipur.It has an average elevation of 377m(1,237).Total Population of Dudu is 14,961 in which 2618 Families are residing.Watersouce of dudu is completely dependent on Bisalpur water supply and Groundwater,which is highly contaminated with fluoride that's why Dudu comes under critical water zone.

JHOTWARA:

Jhotwara is sub-urban area of Jaipur in north-west direction of Jaipur.Population of Jhotwara is 139506 according to the census(2011).It has an average elevation of 447m,that is equal to 1,467feet Villages of Jhotwara are Bangus,Bhambori,Dhankya,Drjanyawas,Hathoj,Kalwar, Machawa,Mundla Ramsar,Nimeda,Niwaru,Pachar,Sarnar chor,Sarna Doongar, Sumet, Lalpura, Shyosynpura.In Jhotwara water is supplied from Bisalpur Dam through pipelines.

PHAGI: Phagi is a tehsil and Panchayat samiti in the Jaipur district in the state of Rajasthan.It is located on the intersection of SH2 and SH12 of Rajasthan.Its minimum elevation is 280.8amsl and maximum elevation is 409.6amsl.According to the census 2011,Total population of this region is 161,610 Covering 169villages with 22,713households.It is divided into seven interespector land revenue Circle-Renwal,Mandor,Nimera,chittora chaura,madhorajpura,It is a dry area with groundwater resources.

KOTPUTLI:

Kotputli is a city in Jaipur District made up of main town named Kot and nearby Putli village which considered as main part of the city. Its maximum elevation is 746.4amsl and maximum elevation is 318.7amsl.It is connectivity between Jaipur and Delhi. According to the Census 2011, Total Population of Phagi is 275367.There are 125 villages and 46909 families in this block.

SANGANER:

Block code of Sanganer is 85.The block has 147villages and there are 27221families in block. According to the census 2011,Sanganer's population is 174893.Minimum elevation of Sanganer is 322.3amsl and maximum elevation is 425.8amsl.

SAMBHAR:

Block code of Sambhar is 83.There are 151villages having 38665houses in this block. According to the census 2011,Sambhar's population is 243001.Maximum and minimum elevation is 353.8amsl and 525.7amsl.

GOVINDGARH: Govindgarh is a town in Govindgarh tehsil in Jaipur District located 48km towards North from district headquarter.Maximum and minimum elevation of Govindgarh is 413.7 and 748.8amsl.

CHAKSU:

Chaksu is situated at a distance of 40km from Jaipur on National highway no.12(Jaipur to Kota Section)Maximum and minimum elevation of Chaksu is 316.5amsl and 631.6amsl.Population of Chaksu according to the census 2011 is 2,23,634.

VIRATNAGAR:

Viratnagar is a town in Northern Jaipur district of Rajasthan located 52km north of Jaipur and 66km west of Alwar. Average elevation of this region is 430m(1,410ft).Total Population of Viratnagar is 17,237.

JAMWA RAMGARH:

Jamwa Ramgarh also known as Ramgarh, sub-division of the Jaipur District in Rajasthan. Located on State Highway 55km about 28km(17mi)East-North of Jaipur City.It is Best known for Ramgarh which is now dry up.Total Population of the Jamwaramgarh is 250,132.There are 233 Villages in the Jamwaramgarh.

REVIEW OF LITERATURE

Hossain.MD.Shahadat(2004),studied about drainage congestion and water logging problem in Bangladesh which located on extensive flood plains of Ganga and Brahamaputra rivers,receives annual rainfall 2320mm.In this study several measures have been adopted like dividing the total watershed into number of drainage zones to check the discharging capacity of the outfall by modified Rational Method and also by improvement in drainage network by primary and secondary drains which are designed to collect excess rainfall that is generated as surface runoff and discharge them to outfall.

Agarwal.sanjay(2009),Studied government policies in relation to clean drinking water management in Jaipur city.Basic objective of the study is to analyze clean water resources in the city.Bisalpur water supply Rajasthan integrated programme studied for the purpose.Study suggested that with the increasing population availability of local water supply is not sufficient and therefore more surface water bodies like dam,lakes etc. should be developed successively .

Garg Abhinav.,Sharma Gaurav(2010),explain about the different methods of conservation of groundwater by Artifical recharge method.According to (CGWD),5micro watersheds in which 0.46million cubic m waste water can be stored,four check dams and sixteen piezometer were established.It was concluded that 49,000cubic m was created in these dams and 1,25,000 cublic meter water has been recharged by these structures. water level has been increased by maximum upto 4m.

Joshi.K.N.(2010),this study founded that due to haphazard growth of colonies,slum squatters and

unplanned land use has breakdown the natural flow of hydrological network in the jaipur city which results in the spread of natural hydrological features like Nallah,River,water bodies in the heart of the city at the cost of peripheral arable land,productive and best ground water recharge zone. Several measures are taken like major water ponds of village and Drainage system which have not come under the influence of urbanization should be protected by connected rooftop through pipeline for harvesting rain water and also by constructing streamlets for future groundwater recharge.

Packialakshmi.S.,Ambujam.N.K.,Mahaliangam.S.(2010),studied about the adverse changes in the land use pattern due to urbanization and unplanned development of water and land resources in the Southern sub-urban area of Chennai City.In this Study Remote Sensing data in the form of satellite imagery of IRS P6 LISS 111 PAN,IRS P6 LISS 4 MX and PAN used land use mapping. It Analyzed that built up area increased from 13% to 23%, quarrying and minning area from 1.045 to 4.3%.

Rajpoot Pushpender Singh,Daiman Amit,Kumar Ajay(2010),this Study studied that groundwater level fluctuation, which is the major problem in India specially in Jaipur City.Due to increase in population water requirement largely depends on groundwater.Area's like Durgapura,Jhotwara, MES Jaipur,Sirsi,Amer,Gopalpura by pass,Mansarovar,Mehona,Surya nagar,Amer,show a continous depleating trend of water level.Main reasons of this depleating water level are over exploration of groundwater,less recharging and shrinkage and dryness of surface water bodies.It is suggested to prepare a proper plan for rainwater harvesting by recharging groundwater.

Saxena Pallavi,Chandra Abhishek,Garg Abhinav Gaurav Sharma,Varma,Prateek,(2010),found

that due to water scarcity in Delhi has arised from various factors one of them is the depleation of the natural resources that is groundwater.This study involves several groundwater recharge method which include direct and indirect method.Direct Recharge method is combination of three subdivided techniques-Spreading method,Recharge Shafts and Injection wells and Indirect and Artifical recharge include Injection Method.At last it concluded that Direct Recharge Method is the best and simplest technique to recharge Groundwater.

Christ Killian.(2011),studied that Indian Subcontinent is characterized by a tropical Monsoon Climate which receives rain for only around 100hours each year.Monsoon is highly important for India as it fills up recervoir,replenishes groundwater and is essential for the Indian agriculture of which around 60% are rainfed.But the Monsoon also causes problems in Indian Cities.Every year the heavy rains make some parts of the city to suffer from water logging.A way to tackle the waterlogging problems as well as the ever decreasing levels of groundwater could be rainwater harvesting, a technology that has been used for thousand of years. Many Indian cities among them Hyderabad,have already made it mendator for new buildings which cover a certain area to have facilities to capture the rainwater runoff and use it to recharge the groundwater.

Jethoo A.S,Poonia M.P(2011),studied about the supply of drinking water in jaipur city,Main objective of this study is to revive the policy of drinking water supply which depends upon groundwater and dams like Ramgarh,Bisalpur Dam where now any hardly any water left.76% water is supplied through municipal water supply,17% of household having their own arrangement of water supply through tubewell.In this study we found that water supply in 24% is only for one and half hour which is the main reason for dissatisfaction of consumer.Due to this some technical measures like network improvement,leak repair,installation of water saving

devices etc. are introduced and also reduce water quantity for domestic consumption.

Jethoo.A.S., Poonia M.P.(2011),studied about tremendous problem of drinking water in jaipur city.Population of jaipur city has increased exponentially,leading acute shortage of drinking water.Major objective of this study is changing public perception towards water use because with dimishing resources of drinking water,the humans behaviour towards water conservation is not changing.This study shows that HIG and MIG incumbents,changes in lifestyle,also the climate change lead to increase in water consumption.To overcome several domestic water saving measures and technical measures like changes in water supply,improving maintenance, installation of some water saving devices can be adopted.

Magesh.N.S.,Chandrasekar.N,Soundranayagam John Prince(2011),studied about groundwater potential zones in Theni District of Tamil Nadu using remote sensing and GIS.MIF Techniques is found efficient to minimize the time,labour and money and thereby enables quick decision making for sustainable water resources management.Satellite imageries,topographic maps and convential data were used to prepare the thematic layer's of lithology,lineament density,drainage density,slope,soil,land-use and rainfall.

Bhattacharya Pritha (2013), studied that atleast 70% of Jaipur Receives water with a high concentration of TDS or Contaminated bacteria, and also founded that 90%of water dependent on groundwater and 10%supplied from Ramgarh lake.Main objective of this study is to check water quality that is highly contaminated with alkalinity,calcium,magnesium,tds etc. To overcome this problem two water treatment plant-LAXMAN DOONGRI PLANT and NEW FILTER PLANT installed to avoid manual mixing of alum solution which improve

sedimentation and in these plants due to absence of functional preparation tanks disinfections is done by mixing bleaching powder.

Dass Amit,Jethoo A.S. And Poonia M.P.(2013),studied about the case study of Rambagh Dam which is now dried up due to unplanned construction of several water bodies where water is entrapped before coming to the dam and several authorized mining activites in catchment area which also caused obstruction in natural flow of rainwater. Several measures are taken like remove obstruction from local nallah,drain etc. and water bodies having high structures can be gated and water bodies having low height can be modified which will serve the purpose of local needs.

Robert Kathleen,Reineer Michael,Gray Kimberly (2013), studied about the obstruction of Ground water recharge system due to anthropogenic activities such as deforestation,destruction of local water system,stoppage of river flows and paving/concretization Urbanization and development greatly affects groundwater recharge as impervious land does not allow water to permeate.Land Use change has greatly influence on groundwater recharge as built up area increases and there is more developed land in the form of roads,houses etc results less area are available for groundwater recharge and this results in local flooding,as water collects on the surface of concretized land.

Zamani Mojtaba,Sadoddin Amir,Garizi Zare Arash.(2013),this study aimed to assess the longterm association between land cover/Land Change and Water Quality changes occurred in the Ziarat Catchment,upstream of the Gharasoo River Basin,Golestan Province north east of Iran.The Spatial Analysis shows that within four decades about 980 ha of forest in the catchment

have been converted to other classes of Land Cover/Land Use(about 67% to crop lands,8.5% to residential,13% to bareland and 11.5% to roads.The result of this study shows that in stream water quality trends of the Ziarat catchment has been likely related to land Use change.There are number of natural and human induced driving factors involving that adds to the complexity of the river system and its attribute.To avoid a Serious threat to the health of stream ecosystem and local communities in the Ziarat catchment,pollutants particularly agricultural runoff and human wastes should be controlled effective through implementing proper management policies and action.

Sahu Abhay Shankar(2014),The Primary objective of this study is to identify water logged areas in Moyna Basin,India and to explore their contemporary economic significance.Waterlogged areas are identify by using satellite images as well as mapped by using supervised classification method NDVI,NDMI and modified NDWI and NDMI.In this Article we studied that waterlogged problem can also be taken into economically benifitted instrument like fishing, agriculture activity etc.

Aher.K.R.,M.Patil.Suryakant,Mane.V.P.(2015),studied that direct precipitation received in the main source of groundwater recharge in Anchalagaon village.In this study recharge trench and shafts artificially recharge structures used for recharging shallow pheratic aquifer.Recharge shafts is an artificial recharge structures which penetrate the overlying impervious horizon and provides affective access of surface water for recharging the pheratic aquifer.

Kurunthachalam senthil kumar(2015),Main objective of this study is to improve the water quality by reducing domestic and industrial wastes discharged into rivers by small industries that

contribute to a great deal of pollution.Common effluents plant and largest sewage treatment like (STPs),(ETPs) need to construct in big cities and industrial zone to treat and eliminate bacterial pollution , untreated sewage generated by renewal(90%)and urban (50%) and nuclear waste produced from industrial and scientific process.

Kumar Praveen(2016),Studied that Haryana groundwater withdrawl is more than its recharge. Groundwater recharge can be done by artificial recharge and rainwater harvesting by using various methods for urban and rural areas.In urban areas recharge can be done through recharge pit,recharge trench, recharge wells and recharge tubewell.In rural areas recharge can be done by saving water going waste through slopes,rivers,rivulets and nalas by harvesting through gully plug,contour bund,gabion structure,check dams,recharge shafts,percolation tank.

Revival of Mansagar Lake,Jaipur:A case study(2016),Main objective of this study is revival of Mansagar which have been example of polluted water body by receiving city sewage due to which aquatic life of the lake deteriorated and migratory birds stopped arriving.Two Steps are taken to check the sewage and solid waste from entering the lake through drains.After the revival of Mansagar lake it has now turned into a tourist spot and picnic spot locals and tourist can be seen enjoying evening on the lake front developed by JDA.

Roy Ria,Dhali M.D. Kutubuddin(2016),studied about water logging problem which has become major problem in this Metro city Kolkata.Physical setup like active clay layer,presence of marshy land and social setup like growing urbanization land and number of non-biodegradable solid waste are responsible for this devastating situation.Studies have identified main waterlogged zone,world wise water logged situation,waterlogged road and traffic

congestion. K.M.C.had provided recommendation for setting up new pumping station and maintaining the drainage and sewage system but due to lack of K.M.C. interest they are not maternised properly this situation increase day by day.

Uddin Shahab,Dr.Akramal Alam.MD,Parvej MD(2016),Main objective of this study is to solve the problems like waterlogging, groundwater depleation by artificial infiltration system.In this study artificial infiltration well for groundwater storage capacity are observed using well pipe,screening,B-pipe,filtration.According to this study soil permeability also plays an important role,where soil is high permeable, well pipe easily pasess the rainwater to the aquifer rather than the area where permeability is low.Permeabilty and storage capacity are determined by Darcy's Law.

Ma Bin,Liang Shuai,Liang chao and Yijial li(2017),this Research mainly focuses on the stability of the plunge floor and studies on slope protection safety. A series of experiments were conducted to investigate the protective measures for slope protection and the result showed that the high seepage pressure on the back surface of the slope linning plate and poor correlation between the fluctuating pressure on both plate.Surface may cause large pressure that seriously threatn the stability of the slope linning plate.Therefore a self drainage slope protection structure was proposed to reduce hydraulic load on a slope linning plate and effectively reduce the total pressure on the plate and significantly increase the operational safety of the plunge pool.

Mehedi Hassan Khan.Md.(2017),this study identified main waterlogged areas in southern-

western region of Khulna city by using ARC GIS 10.4 SPSS and Microsoft Excel.This Research focused on the water logging situation that is caused by high intensity rainfall and runoff in the city area that is inundated due to unplanned and inadequate drainage system.Disapperance of natural drainage system and inefficient management.

Paneria Bahubhai Dipali,Mehta D.Vishva,Bhatt Vijaykumar Bhasker(2017),According to him Sabarmati River Front Development Project includes environmental improvement,social upliftment and urban rejuvenation.Major objective of the project is to manage river as critical infrastructure and includes major interceptor sewer lines and sewer Discharge points.The Diaphragm walls are also built into the riverbed which protect low lying areas from periodic flooding.This Project is designed to Maximise the use of reclaimed land for public purpose and raise the threshold for city planning.

Fang Ning-Yung,this study analyzes and summarizes the reasons behind the water logging and also introduces the “Sponge City”Technology to prevent waterlogging by constructing large scale storage tank,additional pumping station,improving the drainage pipe network standards also by replacing concrete pavements with wetlands,green rooftops and rain gardens means stormwater is absorbed back into the land making water work for the city instead of against it.In Lingang the wide street are built with permeable pavements allowing water to drain to the soil. Tarun Bharat Sangh and Common Water in Rajasthan:Water Solution,Studied Tarun Bharat Sangh a non governmental organization that brings people together on the issue of management of forest and water resources,had participated in the construction of johads earthn small scale reservoirs that help to harvest rainwater and improve the recharge of groundwater resources.The

impact has been tremendous: five rivers that used to run dry after the annual monsoon season are now alive with flows once again and groundwater level have risen by 6m and crucial forest cover which helps to maintain integrity and water retaining capacity of the soil,had increased by 3.3% .One of TBS's current compaings focuses on the protection of the Yamuna River through challenging existing development plants and promoting forest conservation and expansion in the river flood plain.

Fu Liya and You-Gan Wang, found that the water quality data are often collected at different site s over time to improve water quality management. It is essential to apply appropriate statistical methodology when analyzing water quality data to draw valid conclusions and hence provide useful advice in water management. In this study statistical methods for analyzing water quality data have been introduced like Three typical graph, box plots, q-q plots and scatter plots which contain appropriate summarized information about data sets are used to provide insight for analyst into datasets. Several popular methods such as Mann-Kendall, the seasonal Kendall test, and Multiple Regression Methods(1992)are also introduced.

DRAYAWATI RIVER PROJECT-TATA PROJECT LIMITED, Drayavati River also known as AMANISHAH NALLA. This project aims to restore dry and arid landscape. Main objective of this project is to turning the nallah into river by constructing seven treatment plant to treat 170 MLD of sewage and construct more than 100 fall structures so that water will flow throughout the year. Under this project 1600 trees planted to devlop 6500 squares meter green area to made it a tourist destination.

METHODOLGY

A BRIEF INTRODUCTION OF STUDY AREA

As discuss earlier Jhotwara is sub-urban area of Jaipur in north-west direction of Jaipur. Population of Jhotwara is 139506 according to the census(2011).It has an average elevation of 447m,that is equal to 1,467feet Villages of Jhotwara are Bangus, Bhambori, Dhankya, Drjanyawas,Hathoj,Kalwar, Machawa,Mundla Ramsar,Nimeda,Niwaru,Pachar,Sarnar chor, Sarna Doongar,Sumet,Lalpura, Shyosynpura.In Jhotwara water is supplied from Bisalpur Dam through pipelines. Jhotwara block is further divided into several areas in which groundwater fluctuates from year by year.In Rotary Club from 2009-2011,it increases from 56.7m to 61.08 after that they dried up.In Sirsi,groundwater level decreases from 80.08 to 71.64 in 2014,then after dried up. In Bhakrota It increases in 2017-2018 from 70.7 to 70.35.In Bindayaka,level decreases from 45.38 to 45.35.In CGWD Campus Jaipur, groundwaterlevel fluctuates it increases from 56-60.8 in 2013-2014,then decreases 60.8-54.6 in 2014-2015,again increases from 54.6-55.9 in 2015-2018.In GWD Campus,groundwater level decreases from 53.78 to 53.18 in 2017-2018.In Harmara,It increases from 63.76 to 88.54 from 2017-2018.In Heerpura groundwater level increases from 73.05 to 75.17 in 2017-2018.In Mahal,it increases in 2017-2018 from 41.04 to 55.1.In each region 3% of the total villages are selected for the survey. Durgapura groundwater level continuously fluctuating from year to year,(51.7-62.8) in 2009-2010,further it decreases (62.8-56.27) in 2010-2011,again increases(56.27-63.82) in 2011-2013, decreases in 2014 by (52.7) Increases (52.7-59.47) in 2015-2016,decreases(59.47-56.33) in 2016-2017,again increases in 2018 by 59.8. In Niwaroo groundwater level increases from 2009-2014 by(48.8-58.33) after that they dried up.In Amber,it increases from 2009-2013 by (11.55-13.75) after it decreases from 2014-2016 by(11.9-10.8) and from 2017-2018 it reaches from 12-11.75.In N.Purohitan,groundwater level increases from 37.9-51.5 in (2009-2018). In

MES Jaipur groundwater level was 53.8 after that from 2014-2018,it was continuously Depleating from 45.88-36.5.In Kalwad it increases from 35.5-47.53 in(2009-2013) after that it fluctuates year by year.It decreases in 2014 by (41.7) after that it again increase in 2015 by (44.83) it continuously depleating from (2016-2017) by (44.9-43.9) again increases in 2018 by (45.1).Gopalpura by pass level increases from (2009-2010)by(39.1-41.5)after that they dried up.

RESEARCH DESIGN OF THE STUDY

Plan of work

Reconnaissance Survey

↓

Questionnaire Preparation and testing

↓

Sampling Design

↓

Survey and Data Collection

↓

Secondary Data Collection

↓

Primary Data Collection

↓

Data Tabulated,Interpretation and Analyzed

↓

Conclusion and Suggestion

Sample Size:

Jhotwara block is selected for the research purpose in present study on the basis of water Resource avability,population pressure and resource utilization .According to zonal classification given by Groundwater resource department Jaipur, Jhotwara block is classified as over exploited notified area. Jhotwara block is divided into 20areas,from which 10% Block is selected for the survey. Out of which 5% of the total population of these selected areas will be selected as sample size on the basis of Convenient Random Sampling and also one sample will be taken from each block of the Jaipur so that comparative analysis can be done.

OBJECTIVE:

1) To Identify Surface Water and Ground water in Jaipur Region.
2) To Identify Groundwater recharge system in Jaipur Region.
3) To Identify the waterlogged areas and also to analyse the present Scenerio of Channelizing Rain water and its future prospects.

CHAPTERIZATION:

The work is divided into following Chapters Tentatively:

CHAPTER 1

- General Statement of the Problem.
- General Introduction of Study Area of Jaipur Region
- Review of Literature
- Chapterization
- Methodology

CHAPTER 2

- General Physical Background.
    - Physical Features in Geomorphology
    - Drainage Pattern
    - Climate and soils etc.

CHAPTER 3

- Social economic profile
- Population
- Economic Activities

CHAPTER 4

- Surface water resources status,utilization,conservation

CHAPTER 5

- Ground Water Resources Status,Utilization,Conservation

CHAPTER 6

- State Water Policy
- Evaluation

CHAPTER 7

- Traditional Water Harvesting System

CHAPTER 8

- Result analysis,Problems,Challenges,Future Prospects

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